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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/470,446 12/22/99 INGLE

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FLEHR HOHBACH TEST
ALBITTON & HERBERT LLP
SUITE 3400 FOUR EMBARCADERO CENTER
SAN FRANCISCO CA 94111

IM52/0531

EXAMINER

ZERVIGON, R

ART UNIT

PAPER NUMBER

1763

DATE MAILED:

05/31/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/470,446

Applicant(s)

Ingle et al

Examiner

Rudy Zervigon

Art Unit

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~ The MAILING DATE of this communication appears on the cover sheet with the correspondence address ~

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Nov 9, 2000
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirements.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Dec 22, 1999 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2,3
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

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DETAILED ACTION

Drawings

1. Figures 1-4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 13-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 defines variables "N" and " A_{port} " which are not used among the "properties" described. Variables Na_{port} and D_{in} are not defined among the "properties" described.
4. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 contains "effective annular space". Effective for what? There may be additional functionality required in the claim.
5. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 contains "substantial length". Substantially the entire length?

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Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 6, 7, 9, 11, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawakami Soichiro (JP61-37969)¹. Kawakami Soichiro describes:

- i. 1. A gas delivery metering tube (item 23, Figure 3 - Figures 1,2) for delivering a gas (Purpose, first line), comprising:
- ii. at least one innermost (item 3, Fig.1,2) and outermost (items 2,1, Fig.1,2) axially aligned, nested tubes having an effective annular space (items 18-20, Figures 1,2; “buffers”, Constitution) formed between the at least one innermost (item 3, Fig.1,2) and outermost (items 2,1, Fig.1,2) nested tubes;
- iii. one or more arrays of orifices (items 13, 14, 15; Fig. 1,2) formed in each of the at least innermost (item 3, Fig.1,2) and outermost (items 2,1, Fig.1,2) nested tubes and extending along the substantial length (Figures 1,2) of each of the tubes
- iv. wherein a substantially uniform (“stably and uniformly”, Constitution) backing pressure is created within and along the substantial length of the innermost (item 3, Fig.1,2) tube, thereby promoting substantially uniform (“stably and uniformly”, Constitution) delivery of the gas

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- (Purpose, first line) out of the orifices (items 13, 14, 15; Fig. 1,2) in the outermost (items 2,1, Fig.1,2) tube and along the substantial length of the outermost (items 2,1, Fig.1,2) tube
- v. 6. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein the metering tube (item 23, Figure 3 - Figures 1,2) is used in a chemical vapor deposition system.
- vi. 7. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein gas (Purpose, first line) is supplied to one end (interface of items 5 and 4 - Figure 1) of the innermost (item 3, Fig.1,2) nested tube.
- vii. 9. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein the nested tubes are cylindrical.
- viii. 11. In combination, the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 and at least one injector assembly (item 4, Figure 1, item 6a, Fig.4) having at least one port (item 8, Figure 1, item 3a, Fig.4) for receiving the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2).
- ix. 12. In combination, the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 and at least one shield (item 21, Figure 3) assembly having at least one plenum (inside portion of item 21, Figure 3) for receiving the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2).

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Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2-5, 8, 10, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami Soichiro (JP61-37969)². Kawakami Soichiro does not describe:

- x. 2. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein the effective annular space (items 18-20, Figures 1,2; "buffers", Constitution) has an effective diameter D_{eff} and the innermost (item 3, Fig. 1,2) tube has an inner diameter D_{in} , and D_{eff} and D_{in} are within a factor of three of each other.
- xi. 3. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 2 wherein D_{eff} is approximately equal to D_{in} .
- xii. 4. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein a ratio of the surface area of the outermost (items 2,1, Fig. 1,2) tube to the total cross sectional area of the orifices (items 13, 14, 15; Fig. 1,2) formed in the outermost (items 2,1, Fig. 1,2) tube is equal to or greater than approximately 10.

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- xiii. 5. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 4 wherein the ratio is greater than 100.
- xiv. 8. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein the innermost (item 3, Fig.1,2)tube has a length and a diameter and the ratio of the length to the diameter is in the range of approximately less than 70.
- xv. 10. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein the nested tubes are rectangular.
- xvi. 13. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 1 wherein the innermost (item 3, Fig. 1,2)tube has the following properties:

$$L/D < 70$$

$$D/d \approx > 10$$

$$N a_{\text{port}} / A_{\text{tube}} \approx \leq 1$$

where L is the length and D is the diameter of the innermost (item 3, Fig.1,2)tube, d is the diameter of one orifice in the array of orifices (items 13, 14, 15; Fig. 1,2) in the innermost (item 3, Fig.1,2)tube, N is the number of orifices (items 13, 14, 15; Fig. 1,2) in the innermost (item 3, Fig.1,2)tube, A_{port} is the cross sectional area of each of the orifices (items 13, 14, 15; Fig. 1,2), and A_{tube} is the area of the innermost (item 3, Fig.1,2) tube; and the outermost (items 2,1, Fig.1,2) tube has the following properties:

D_{eff} and D_{in} are within a factor of three of each other

$$\text{SurfaceArea}_{\text{outer}} / N A_{\text{outer}} \approx 10 \text{ or more}$$

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where D_{eff} is the effective annular space (items 18-20, Figures 1,2; "buffers", Constitution), $SurfaceArea_{outer}$ is the surface area of the outermost (items 2,1, Fig. 1,2) tube and NA_{outer} is the total cross sectional area of all of the orifices (items 13, 14, 15; Fig. 1,2) in the outermost (items 2,1, Fig. 1,2) tube.

- xvii. 14. The gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 13 wherein D_{eff} is approximately equal to D_{in} .
- xviii. 15. In combination, the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 13 and at least one injector assembly (item 4, Figure 1, item 6a, Fig.4) having at least one port (item 8, Figure 1, item 3a, Fig.4) for receiving the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2).
- xix. 16. In combination, the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2) of claim 13 and at least one shield (item 21, Figure 3) assembly having at least one plenum (inside portion of item 21, Figure 3) for receiving the gas (Purpose, first line) delivery metering tube (item 23, Figure 3 - Figures 1,2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary either the dimensions (L,D) of the gas delivery metering tube or vary the distribution (Na_{port}) and/or the dimension ($d, A_{port/tube}$) of the orifice and/or tube dimensions.

Motivation for varying either the dimensions (L,D) of the gas delivery metering tube or varying the distribution (Na_{port}) and/or the dimension ($d, A_{port/tube}$) of the orifice and/or tube dimensions is drawn

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from the level of ordinary skill in the art to accomplish the stated "Constitution" - "...the reaction gas is supplied stably and uniformly into the anode from a port 13 of the peripheral wall of the cathode 1." and "To supply stably a reaction gas and to form a uniform thin film by providing plural chambers..." ("Abstract").

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 305-3599. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700